What is claimed is:

1. An instrumented fiber optic tow cable for measuring the temperature profile of a fluid using a plurality of optical fibers which comprises:

a low strain armored fiber optic cable having a core, a jacket concentric with said core and defining an annular space between said jacket and said core;

a plurality of armor wires radially spaced outside the interior of said core in the annular space and defining at least one radially located layer circumferentially concentric and spaced from the interior of said core;

a plurality of optical fibers around said core in a plurality of layers in the annular space interspersed in said core in a plurality of armored wires in the outermost radially located layer;

a light source arranged to send light signals to said plurality of optical fibers which affect light according to temperature profile data in said fluid;

receiver means for receiving the scattered light from said plurality of optical fibers; and

processing means for analyzing said temperature profile in said fluid.

2. The instrumented fiber optic tow cable of claim 1 wherein said processor includes a display unit for getting a visual presentation of said temperature profile data.

3. The instrumented fiber optic cable of claim 2 wherein the said plurality of optical fibers are placed in the outermost layer of said armor wires.

4. The instrumented cable of claim 1 wherein said plurality of armor wires are steel wires.

5. The instrumented cable of claim 4 wherein said plurality of armor wires are KEVLAR™ fibers.

6. The instrumented cable of claim 1 wherein said plurality optical fibers are enclosed in steel tubes to preserve the integrity of said plurality of optical fibers.

7. The instrumented cable of claim 1 wherein said plurality of optical fibers are surrounded by a plurality of steel armor wires of smaller diameter than that armor wires.

8. The instrumented cable of claim 1 wherein more than one fiber is incorporated into the outer armor layer for purposes of redundancy.

9. The instrumented cable of claim 1 wherein Raman scattering effects are used to infer the temperature of the fiber.

10. The instrumented cable of claim 6 wherein a plurality of stainless steel tubes replace said plurality of armor wires and each of said plurality of stainless steel tubes has a diameter less than or equal to the diameter of the corresponding replaced armor wire of each of said plurality of armor wires.

11. The instrumented cable of claim 7 wherein each of said plurality of optical fibers is surrounded by said plurality of steel armor wires of smaller diameter replaces each of a corresponding armor wire of said plurality of armor wires and each of and has an overall diameter less than or equal to the diameter of each of said plurality of the replaced armor wires.

12. The instrumented tow cable of claim 10 wherein each of said plurality replaced armor wire is in the outer layer of armor wires.

13. The instrumented tow cable of claim 11 wherein each of the replaced armor wire of said plurality of said armor wires is in the outer layer of armor wires.

14. The instrumented fiber optic cable of claim 1 which includes a processing system making use of Raman scattering.

15. The instrumented fiber optic cable of claim 14 which uses optical fiber Optical Fiber Domain Reflectometry (OTDR).